

# **CHALLENGES AND WATER TECHNOLOGY OBJECTIVES FOR SUSTAINABLE FORWARD OPERATIONS**

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MILITARY APPLICATIONS FOR EMERGING WATER USE  
TECHNOLOGIES WORKSHOP

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**“FUEL AND WATER ARE THE TWO  
MOST IMPORTANT SUSTAINMENT  
COMMODITIES ON THE  
BATTLEFIELD. THE ULTIMATE  
WEAPON, **THE SOLDIER, RUNS ON  
WATER.** EVERYTHING ELSE RUNS  
ON FUEL.”**



# BASE CAMPS NEED SAME SERVICES AS CONUS INSTALLATIONS





# BUT IN UNCONVENTIONAL ENVIRONMENTS



# AND IF NOT PROVIDED, WILL BE CREATED



# THE COST OF BULK WATER IN THE IRAQ THEATRE IS ~\$5.00-\$15.30\* PER GALLON

- \* THE MAJORITY OF THIS COST IS DUE TO THE SECURITY NEEDED FOR THE TRANSPORT OF ALL COMMODITIES IN THEATRE



# WATER REQUIREMENTS

## Per Soldier/Civilian/Contractor


Low

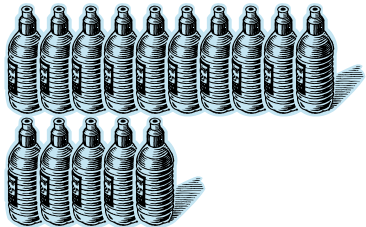


Personal Need  
(consumption, cooking)

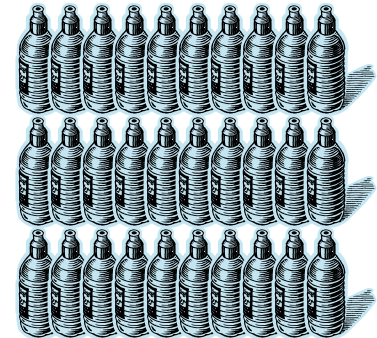
High



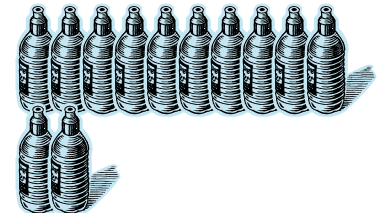
 = 1 gallon



Other uses (bathing,  
washing clothes,  
sanitation, etc.)



Waste (20-30%)



26 Gallons

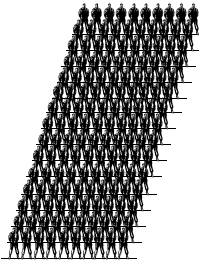
52 Gallons



# WATER REQUIREMENTS

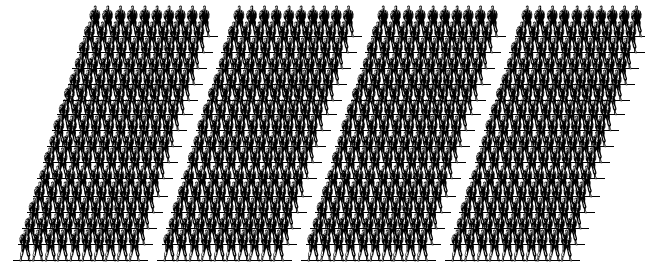
## Company/Battalion/Brigade

### Company



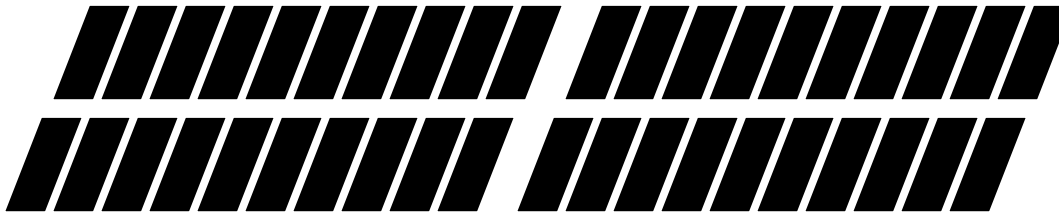
150 Soldiers = 3900 to 7800  
gallons/day

### Battalion



600 Soldiers = 15600 to 31200  
gallons/day

### Brigade



6000 Soldiers = 156,000 to 312,000 gallons/day



# WATER REQUIREMENTS \$

## Company/Battalion/Brigade

Transported					
	\$/gallon	Gallons/Day	Gallons/Year	\$/Day	\$/Year
Soldier	\$ 15.30	26	9,490	\$ 397.80	\$ 145,197.00
Company	\$ 15.30	3,900	1,423,500	\$ 59,670.00	\$ 21,779,550.00
Battalion	\$ 15.30	15,600	5,694,000	\$ 238,680.00	\$ 87,118,200.00
Brigade	\$ 15.30	156,000	56,940,000	\$ 2,386,800.00	\$ 871,182,000.00
Onsite					
	\$/gallon	Gallons/Day	Gallons/Year	\$/Day	\$/Year
Soldier	\$ 5.00	26	9,490	\$ 130.00	\$ 47,450.00
Company	\$ 5.00	3,900	1,423,500	\$ 19,500.00	\$ 7,117,500.00
Battalion	\$ 5.00	15,600	5,694,000	\$ 78,000.00	\$ 28,470,000.00
Brigade	\$ 5.00	156,000	56,940,000	\$ 780,000.00	\$ 284,700,000.00
Municipal Cost US					
	\$/gallon	Gallons/Day	Gallons/Year	\$/Day	\$/Year
Soldier	\$ 0.00150	60	21,900	\$ 0.09	\$ 32.85
Company	\$ 0.00150	9,000	3,285,000	\$ 13.50	\$ 4,927.50
Battalion	\$ 0.00150	36,000	13,140,000	\$ 54.00	\$ 19,710.00
Brigade	\$ 0.00150	360,000	131,400,000	\$ 540.00	\$ 197,100.00



# **WATER TECHNOLOGIES MUST MEET ADDITIONAL CRITERIA TO BE USEFUL AT FORWARD FACILITIES**

- **DEPLOYABLE/PORTABLE**
- **MODULAR (Plug and Play)**
- **EXPANDABLE/SCALABLE**
- **DURABLE**
- **SIMPLE**
- **ENERGY EFFICIENT**
- **REQUIRE MINIMAL FORCE PROTECTION**



MANAGEMENT OF WATER IN-THEATRE  
MUST BE DONE DIFFERENTLY THAN  
SIMPLY USING THE STANDARD  
MANAGEMENT PRACTICES USED IN THE  
UNITED STATES.

WATER IN THEATRE IS TOO VALUABLE TO  
USE FOR CONVEYING “POOP” AND “SOAP”  
TO A CONVENTIONAL WASTEWATER  
TREATMENT PLANT



# CURRENT FORWARD FACILITY WATER MANAGEMENT



# APPROACH TO IMPROVING WATER MANAGEMENT IN-THEATRE

- TREAT AND REUSE WASTEWATER AT THE POINT OF GENERATION
- REUSE/ELIMINATE WASTE WATER AND SOLID WASTE GENERATED BY TREATMENT UNITS
- EXPLOIT NON-CONVENTIONAL SOURCES OF WATER
- CAPTURE STORMWATER
- IMPLEMENT/DEVELOP WATERLESS TECHNOLOGIES



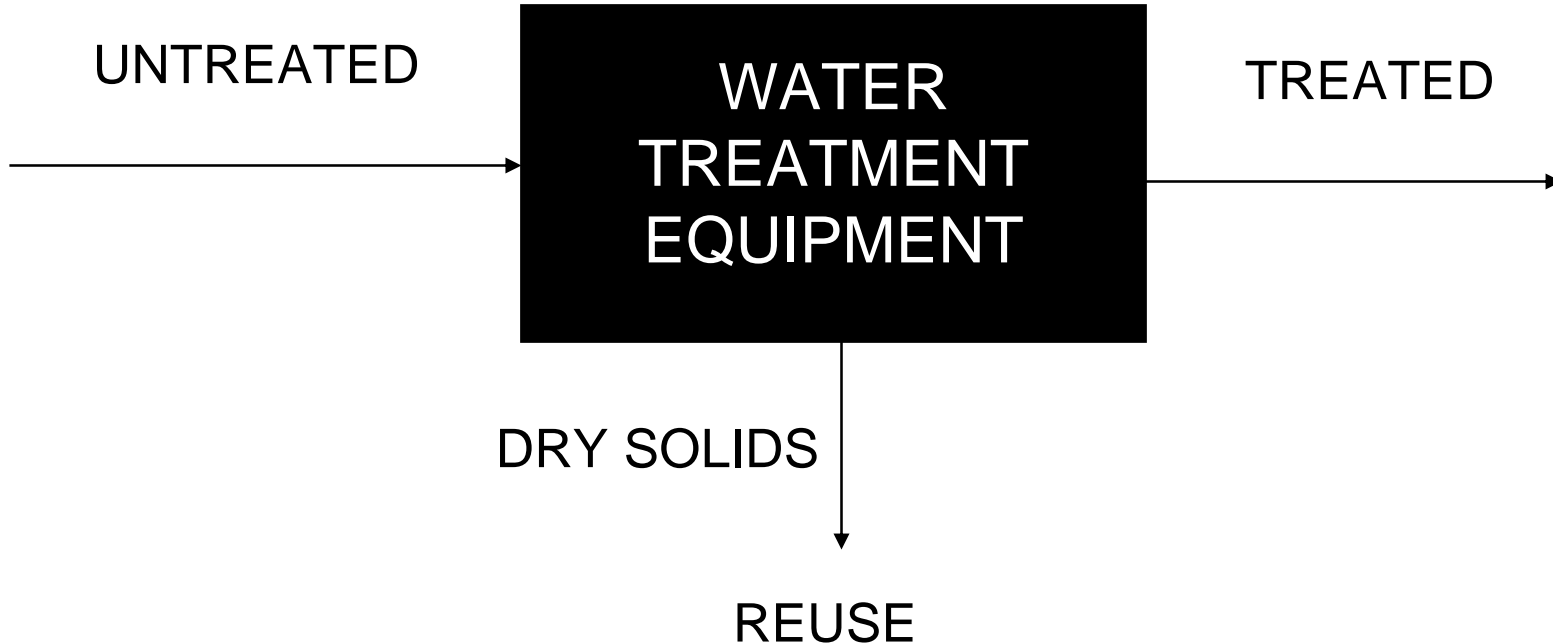
# CHALLENGES

- Lack of Doctrine
- Cross organizational Responsibilities
- Joint, Multinational Operations
- Trained Personnel - Soldiers, Civilians & Contractors
- Command Emphasis and Mission Focus
- Dedicated Specialties
- Continuity of Command
- Standard Designs
- Contractor Support
- Material Availability
- Resource Management
- Political vs. Operational focus
- Stand-off in Urban Areas
- Various sizes and capacities
- Materiel Solutions
- Cost



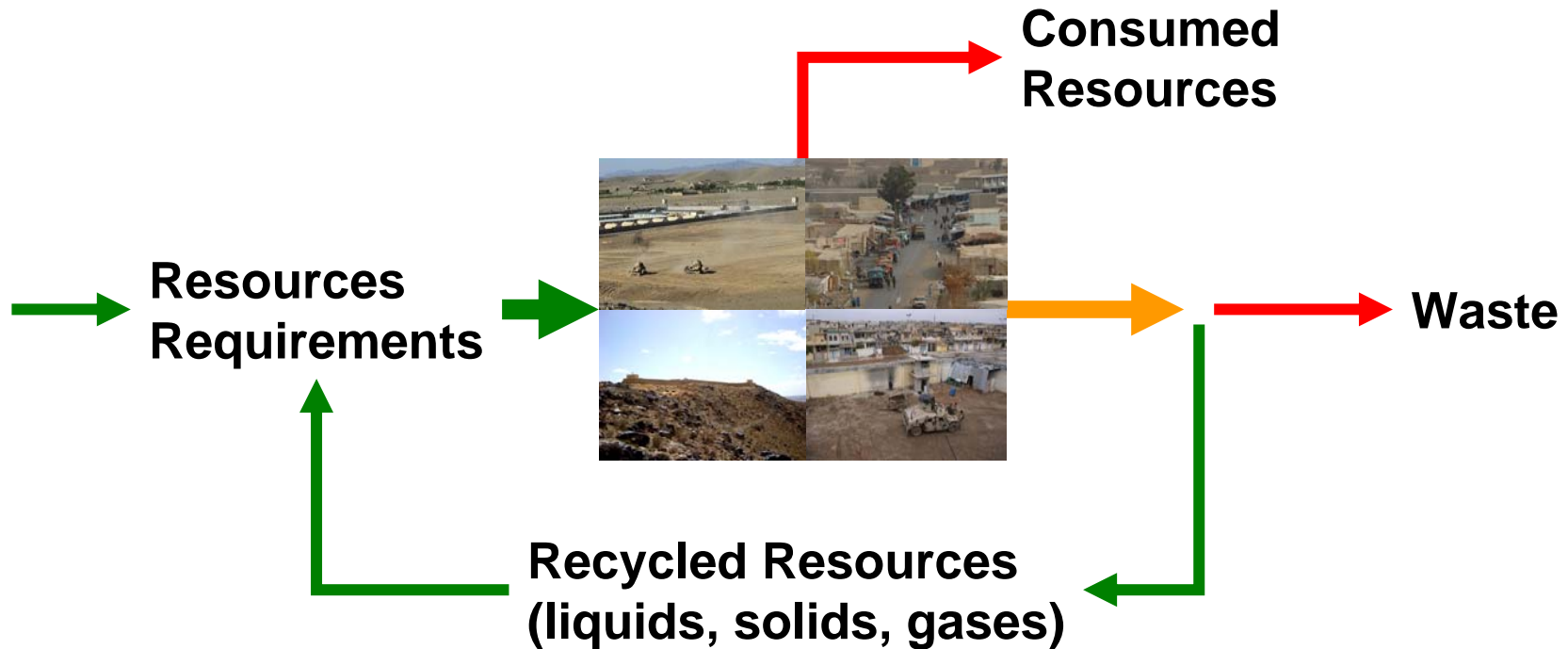
# THE “OLD” IDEAL WATER SCENARIO

WHAT GOES INTO THE BLACK BOX WILL BE DISCUSSED  
DURING THE BREAKOUT SESSION



# THE “NEW” WATER MANAGEMENT SCENARIO

*MUST BE PART OF A HOLISTIC SYSTEMS APPROACH*



$$\text{Resources Requirements} = \text{Consumed Resources} + \text{Waste} - \text{Recycled Resources}$$





# **QUESTIONS**

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